

SEA FLOOR SAMPLES LABORATORY

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ABSTRACT

The main objective of this proposal is to provide continuing support for the curatorial staff of the Woods Hole Oceanographic Institution's sea floor samples laboratory. These personnel are responsible for the maintenance of the existing collection, as well as the execution of ongoing sampling programs. The curation component of this effort involves two phases, the initial processes of archiving and description; and secondly the distribution of these archived materials to investigators who need access to the extensive collection to further their research efforts. The consistent demand for these archived samples continues to demonstrate the value of the asset they represent to the community. Our goal is to insure that new additions to the collection are available in a timely manner to those who specified their collection, and that ready access of older material is maintained in an efficient and modern way. Our staff also supports projects that involve the acquisition of all types of marine geological samples. We are responsible for the design, preparation and deployment of specialized coring and other bottom sampling hardware that is available to the UNOLS community. The integration of curation and acquisition represents a unique blend of resources that provide users with all the fundamentals associated with sea floor samples.

Accomplishments and Results

Throughout the most recent grant period [CY's 99, and 00] we have sustained the programs that have customarily been the backbone of the Sea Floor Sample Laboratory's operations. We have addressed the needs of our international audience of marine geological and geochemical scientists by providing access to the well-documented samples we archive and the data that relate to them. Hundreds of sample requests have been processed and the consistent demand for archived material that this activity represents demonstrates the continuing value that previously acquired materials represent to the community. During the past three years, our sample distribution efforts have benefited more than 100 researchers and investigators from 51 institutions located in six nations. Our experiences in sample sharing over the long term have clearly shown that many researchers in the field depend on the resources made available by our lab and the other repositories in the network to carry on their basic research. Intra-lab referrals are not uncommon when the needs of an investigator cannot be fully satisfied in house, and the NGDC Core Curators File (CCF) continues to act effectively as a central clearing house for initial sample searches. We continue to transmit all new incoming WHOI geological sample station data to the NGDC and are currently fully up to date with submissions. Support from the Office of Naval Research sustains our ability to make access to the collection possible, or as is frequently the case, to fulfill sampling requirements for those investigators who may not have the opportunity to actually visit the laboratory.

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It is critical to insure that new income to the collection is processed and made available in a timely manner to those scientists on the WHOI staff and from outside the Institution that contribute to the archives with samples from new cruises. Careful curation is a key factor in the successful utilization of acquired deep sea floor samples, and the standard procedures that our lab has established, refined and applied over the years assure continuity in annotation and descriptive format that a first time user, or veteran sampler encounters when coming to the facility. Dozens of new sample suites were added to the inventory during the past two years and this income clearly demonstrates the dynamic nature of the collection. The samples come from a broad array of sea floor sampling devices, including various WHOI coring systems (506 new samples equaling 2540 m of new core, a 20% increase in holdings), sea floor dredge hauls (130 new dredge hauls), and Alvin/Jason samples (375 new sample stations). The new materials demand immediate attention so that important initial analyses can proceed without delay. Non-destructive whole core logging of bulk density, P-wave velocity and magnetic susceptibility are routine with our resident Multi-sensor GEOTEK core logger. This popular tool serves users both at sea and ashore and in addition to its continuous data logging mode it has been employed in a number of other innovative analytical applications.

During the grant period we also maintained our assistance programs that include the provision of equipment for ongoing sample acquisition expeditions, consultations on new hardware systems development and design studies, as well as staging and execution of major seagoing sampling programs. Of course principal funding for many of these programs results from other grants, but discussions and technology transfer at the start up level have been a part of our full spectrum of services for many years. In addition to the normal cruise setups and equipment provision during the past three years, highlights of projects that lab personnel executed during this funding period include the establishment of a coring capability for high-resolution climate studies on Lake Titicaca at 13,000 feet in the Andes, and the development of a full suite of resident coring systems for the new Arctic research vessel, the USCG cutter Healy. The first serves a multi-institutional team engaged in research on the lake in Bolivia, and the second represents a major resource that can serve the entire community as the icebreaker Healy will operate much like a UNOLS vessel when she begins operations in 2001. Over the years our experience in staging and executing sea floor sampling operations has established the lab's reputation as a reliable place to get information and advice on sampling techniques, as well as a source for hardware and handling equipment for actual sea going project execution.

During the past year we devoted considerable effort towards the development of a wholly integrated new digitized database that is available for core laboratory applications or via Web browsing at [HTTP://www.whoi.edu/corelab](http://www.whoi.edu/corelab). Utilizing off the shelf resources created by SYBASE and ESRI [a GIS/Internet map Server] we have created an entirely new, interactive, visually rich environment called SedCore 2000 [SC2000] for searching our database and downloading research information concerning the sea floor samples collection. Live, map-based searching, flexible annotated plotting of results, and spreadsheet displays of detailed station information and sample documentation are but a few of the capabilities of the new on-line software. By employing a flexible and user-friendly query builder any suite of simple or complex search parameters can be specified on-line and applied to the database. The results of the search are displayed instantly in highlighted form in a global format with easy to apply pan

and zoom functions, and detailed printable lists of selected station data specifications are available to the user. The search process can be executed on individual sample suites for cores, dredges and Alvin dives; or collectively for a more complete information spectrum. Each major category has a specialized format of descriptive information available relating to the selected samples. For sediment cores, PDF formatted images of the visual core description including a lithologic log, detailed elaboration of down core units and smear slide analysis are displayed. For dredge stations, major rock categories per station are delineated by weight percent enhanced by mineralogical details, weathering and other features. Alvin sample descriptions, by their nature are presented in a hybrid form of the above. In addition to data display and query functions, a special version of the system [for lab use only] integrates our custom core description creation package SEDCOR which utilizes specially composed graphics software that formulates traditional forms and displays intuitively after raw data concerning lithology and smear slide analyses are entered by our staff. While the entire display and query system is currently on line, refinement of the sophisticated software continues and the depth of information about each sample station promises to expand as we exercise the capabilities of this powerful new innovation. The importance of our consistent use of standardized procedures when describing and logging new material into the collection will be especially evident with these new ways to compare, contrast and select station data using SC2000.

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